REMARKS

Claim Amendments

Claim 58 has been canceled. Thus, Applicants request withdrawal of the corresponding § 112 rejection.

Claims 55 and 59 have been amended as suggested by the examiner without altering the scope thereof. These amendments overcome the corresponding claim objections.

In addition, claim 64 has been amended to clarify the claimed subject matter. Support for this amendment is found throughout the specification, *see, e.g.*, page 13, lines 4-7.

Accordingly the amendments do not introduce new matter herein.

§ 112 Rejections

As mentioned above, claim 58 has been canceled. Accordingly, Applicants request withdrawal of the corresponding § 112 rejection.

In addition, claim 64 has been amended to state that the type of membranes disposed in the membrane filtration unit is based on a dimension of the catalyst material. As described in the specification, on page 13, lines 4-7, the membranes can either be micro-filtration, ultra-filtration or nano-filtration membranes depending on the dimension of the catalyst particles. Thus, the specification provides clear support for the claimed subject matter. Accordingly, Applicants request withdrawal of the corresponding § 112 rejection.

§ 103 Rejections

Independent claims 65 and 70 stand rejected under § 103 as being unpatentable over U.S. Patent No. 4,137,162 (Mohri) in view of U.S. Patent No. 5,407,644 (Rytter), U.S. Patent No. 5,607,593 (Cote), U.S. Patent No. 4, 589,927 (Allen) and U.S. Patent No. 4,076,617 (Bybel). Applicants request reconsideration.

The examiner combines five different references to piece together the § 103 rejection. As described below, the rejections do not have any rational technical underpinnings supporting the obviousness rejection. Instead, it appears that the examiner has merely set forth several different references in an attempt to find each of the several different claimed elements. However, simply because several claimed elements may found in several prior art references does not necessarily mean that it would be obvious to one of ordinary skill in the art to combine the teachings of the references to yield precisely what Applicants claim. Moreover, simply setting forth any type of motivation to combine the references does not meet the requirements of a *prima facie* case of obviousness. The motivation set forth by the examiner must have some rational underpinning to support an obviousness rejection.

Claim 65 requires "after directing the influent through the fluidized bed of catalyst material and oxidizing gas in the lower portion of the column reactor, filtering at least a first portion of the treated water in the immersed membrane filtration unit disposed in the upper portion of the column reactor." In rejecting claim 65, the examiner acknowledges that Mohri does not describe the claimed immersed membrane filtration unit. Instead, the examiner cites Rytter for describing a filter unit. The examiner states that it would be obvious to provide a filter in the device of Mohri to "ensure that the catalyst material

is retained in the reactor and not drawn off...with the products stream." Action, p. 6. However, Applicants note that Mohri already describes a method for retaining the catalyst material in the reactor. For example, Mohri state that by using a packing material having a specific pore size prevents the catalyst from flowing out of the reactor. Mohri states the follwing:

> "[t]he porous packing piece has at least one pore having an average pore diameter 1.5 to 8 times, preferably 2 to 5 times, the average particle diameter of the activated carbon particles. If the average pore diameter of the packing piece is less than 1.5 times, it is difficult for the solid particles to move freely through the pores of the porous packing, and it is impossible to maintain a uniform fluidized state of the solid particles....If the size is more than 8 times, the action of the porous packing to control the motion of the solid particles is reduced, and the fluidized state desired in the present invention cannot be achieved. Consequently, the flowing of the solid particles out of the contacting container cannot be prevented."

Mohri, col. 2 line 66 - col. 3, line 13.

Thus, Mohri explains that by keeping the pore size of the packing material below 8 times that of the average diameter of the activated carbon particles, the activated carbon particles will not flow out of the container. In addition, Mohri describes that by maintaining the carbon particles at least 5 cm below the packed bed, the carbon particles will not flow out of the reactor. *See*, Mohri, col. 4, lines 11-29. Thus, one of ordinary skill in the art, seeking to prevent the carbon particles from flowing out of the reactor, as suggested by the examiner, would not look to Rytter for such a solution. Instead, one of ordinary skill in the art understands that Mohri already teaches several different ways to prevent the carbon particles from flowing out of the reactor. Thus, for at least this reason, it would not be obvious to one of ordinary skill in the art to combine the teachings of Mohri and Rytter.

Further, even if one of ordinary skill in the art wanted to look for a different way to prevent the carbon particles from flowing out of Mohri's reactor, one would merely use a simple screen filter - not an immersed membrane - to keep the carbon particles in the reactor. An immersed membrane is much more expensive and difficult to maintain than a simple screen filter. One of ordinary skill in the art would not go to the expense to install an immersed membrane filtration unit in Mohri's reactor simply to retain the carbon particles in the reactor.

In addition, the examiner states that it would be obvious to place a filter in the upper portion of the reactor so the "contaminated water...would have had ample opportunity to contact the catalyst and the oxidizing gas." However, the examiner's reasoning is flawed. It is not necessarily true that a filter should always be placed in the top portion of a reactor in order to provide ample opportunity for the wastewater to contact the reagents within the reactor. Instead, several other factors contribute to the time wastewater contacts the reagents in the water. For example, the volume of the reactor, the flow rate of the wastewater, and the operating pressures all contribute to the residence time in a reactor. Thus, one of ordinary skill in the art understands that the residence time can be increased by varying several different parameters in the reactor. For example, if conditions are properly set, wastewater being introduced into the reactor having a filter disposed in the middle or bottom portion of the reactor may have a higher residence time within the reactor than wastewater being introduced into a reactor having a filter in the top portion of the reactor. There is simply no technical reason one of ordinary skill in the art would change Rytter's simple filter to the claimed membrane

filtration unit and then place the membrane filtration unit in the top portion of Mohri's reactor, as suggested by the examiner.

In addition, claim 65 requires "recirculating at least a portion of the non-permeated treated water from the upper portion of the column reactor, through a recirculation line that lies outside of the column reactor and back into the lower portion of the column reactor." In rejecting claim 65 the examiner acknowledges that neither Mohri nor Rytter disclose the claimed recirculation line or a method of recirculating non-permeated (non-filtered) treated water. Thus, the examiner cites Allen for this teaching and states that it would be obvious to "provide a recirculation line...in order to allow for multiple passes of slurry through the reactor, thereby allowing for a more complete reaction at high flow volumes." Action, p. 6-7. However, even assuming that it would be obvious to place such a recirculation line into the modified Mohri reactor, the examiner has failed to show why it would be obvious to recirculate only non-permeated treated water through the recirculation line. That is, the examiner has not addressed why one of ordinary skill in the art would not recirculate the permeated (or filtered) water back into the reactor. Presumably, recirculation of the permeated water would also allow for "a more complete reaction at high flow volumes," as suggested by the examiner. Accordingly, it appears that the examiner has merely found the various elements of the claim in several different references and has used improper hindsight to combine these references. That is, it appears that the examiner has used knowledge gleaned only from Applicant's disclosure to reconstruction the claimed invention. Such hindsight reconstruction is improper. Instead, the proper test for obviousness is whether one of ordinary skill would have some rational reason to combine the

references. Here, the examiner has failed to show any rational reason why one of ordinary skill would include Allen's recirculation line in a modified Mohri reactor to recirculate non-permeated treated water through the recirculation line. Thus, for this additional reason, claim 65 and its dependent claims define patentable subject matter over the cited art.

Related limitations are found in independent claim 70 which requires that "a substantial portion of the fluid bed of catalyst material is disposed in the lower portion of the column reactor" and " [a] membrane filtration unit being disposed in the upper portion of a column reactor over a substantial portion of the fluidized bed." In addition, claim 70 requires "a recirculation line extending exteriorly of the reactor for directing a non-permeated treated water stream from the upper portion of the column reactor into a bottom portion of a column reactor." For substantially the same reasons as discussed above, claim 70 defines patentable subject matter over the cited art.

For the reasons set forth above, it is respectfully urged that the present application is in condition for allowance and allowance is requested.

Respectfully submitted,
COATS & BENNETT, P.L.L.C.

Dated: November 2, 2009

Kathleen A. Cavanagh
Registration No.: 59,911
Telephone: (919) 854-1844
Facsimile: (919) 854-2084